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Dept.: E/M

By: EHK:SAM:yes

✓ OSMM&N File No. 248354US-2S DIV

Serial No. New Divisional Application

✓ In the matter of the Application of: Ichiro OMURA et al.

✓ For: POWER SEMICONDUCTOR SWITCHING ELEMENT

Due Date: February 3, 2004

The following has been received in the U.S. Patent Office on the date stamped hereon:

■ 57 pp. Specification 47 Claims/Drawings 23 Sheets and
✓ 4 Pages Application Data Sheet

✓ ■ Combined Declaration, Petition & Power of Attorney 2 Pages

✓ ■ Utility Patent Application Transmittal

✓ ■ Request for Priority

✓ ■ Credit Card Form for \$770.00

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✓ ■ Fee Transmittal Form

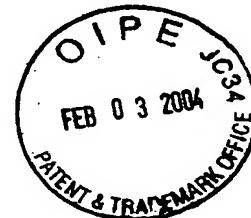
✓ ■ Preliminary Amendment (7 pgs)

✓ ■ Information Disclosure Statement

■ PTO-1449

✓ ■ Statement of Relevancy

✓ ■ White Advance Serial Number Card



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PATENT
DOCKET NO: 248354US-2S DIV

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
ICHIRO OMURA ET AL. : EXAMINER: NOT YET ASSIGNED
SERIAL NO: NEW DIVISIONAL :
APPLICATION
FILED: HERewith : GROUP ART UNIT: NOT YET
ASSIGNED
FOR: POWER SEMICONDUCTOR :
SWITCHING ELEMENT

PRELIMINARY AMENDMENT

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Prior to the examination on the merits, please amend the above-identified application
as follows without prejudice:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on
page 3 of this paper.

Remarks begin on page 7 of this paper.

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IN THE SPECIFICATION

Please replace the paragraph beginning at page 1, line 4, with the following rewritten paragraph:

--This application is a divisional of and claims the benefit of the earlier filing date of allowed U.S. Patent Application Serial No. 09/892,545, filed June 28, 2001, the entire contents of which are incorporated herein by reference.--

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IN THE CLAIMS

Please amend the claims as follows:

Claims 1-3 (Canceled).

Claim 4 (Original): A semiconductor element comprising:

a semiconductor substrate of a first conductivity type having a first major surface and
a second major surface opposing the first major surface;

a drift layer of the first conductivity type formed on the first major surface of said
semiconductor substrate;

a well layer of a second conductivity type selectively formed in a surface of said drift
layer;

a first trench formed to reach at least an inside of said drift layer through said well
layer;

a buried electrode formed in said first trench through a first insulating film;

a source layer of the first conductivity type selectively formed in a surface of said
well layer between said first trenches;

a second trench formed to reach an inside of said drift layer from a surface of said
source layer through said well layer;

a control electrode formed in said second trench through a second insulating film;

a first main electrode formed on the second major surface of said semiconductor
substrate; and

a second main electrode connected to said source layer and said well layer.

Claims 5-7 (Canceled).

Claim 8 (Original): An element according to Claim 4, wherein said first insulating film has a thickness larger than a value obtained by multiplying a static breakdown voltage of said element by 20Å.

Claims 9-11 (Canceled).

Claim 12 (Original): An element according to Claim 4, wherein the first insulating film is thicker than the second insulating film.

Claims 13-15 (Canceled).

Claim 16 (Original): An element according to Claim 4, wherein an impurity concentration of said drift layer gradually increases toward said semiconductor substrate.

Claims 17-19 (Canceled).

Claim 20 (Original): An element according to Claim 4, wherein an impurity concentration of said drift layer is high near side walls of said first and second trenches.

Claims 21-23 (Canceled).

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Claim 24 (Original): An element according to Claim 4, wherein each of said first and second trenches takes the form of a stripe.

Claims 25-27 (Canceled).

Claim 28 (Original): An element according to Claim 4, wherein each of said first and second trenches has one of circular, rectangular, and hexagonal shapes.

Claims 29-31 (Canceled).

Claim 32 (Original): An element according to Claim 4, wherein said buried electrode is electrically connected to said first or second main electrode.

Claims 33 – 35 (Canceled).

Claim 36 (Original): An element according to Claim 4, wherein said buried electrode is formed by burying a semi-insulating film in said trench through the first insulating film.

Claims 37 – 38 (Canceled).

Claim 39 (Original): An element according to Claim 4, wherein said second trench is formed to be shallower than said first trench.

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Claim 40 (Original): An element according to Claim 4, wherein said second trench is formed to cross said first trench, and said source layer is formed in contact with said second trench.

Claim 41 (Original): An element according to Claim 4, wherein said second trench is formed along said first trench, and said source layer is formed in contact with said second trench.

Claims 42-44 (Canceled).

Claim 45 (Original): An element according to Claim 4, wherein said buried electrode set in a floating state.

Claims 46-47 (Canceled).

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REMARKS

Favorable consideration of this Application as presently amended and in light of the following discussion is respectfully requested.

Claims 4, 8, 12, 16, 20, 24, 28, 32, 36, 39, 40, 41 and 45 are pending in the present Application. Claims 1-3, 5-7, 9-11, 13-15, 17-19, 21-23, 25-27, 29-31, 33-35, 37, 38, 42-44, and 46-47 have been canceled, without prejudice or disclaimer.

This application is a divisional of and claims the benefit of the earlier filing date of allowed U.S. Patent Application Serial No. 09/892,545, filed June 28, 2001, and includes non-elected Claims 4, 8, 12, 16, 20, 24, 28, 32, 36, 39, 40, 41 and 45 of the parent application corresponding to the embodiment of Figure 28. Applicants submit that no new matter has been introduced via this Amendment.

In view of the foregoing, favorable consideration of this amendment is felt to be in order and the same is hereby respectfully requested.

Respectfully submitted,

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